Advantages and Disadvantages of Species-rich Grassland Restoration Methods

Choosing a method of restoration should take account of the relationship between the donor and recipient sites, the funding available, the logistical operations of transferring and spreading seed, and the amount of time it takes for the seed to establish and start to look like a wildflower meadow. The table below outlines some advantages and disadvantages of each method that should be taken into consideration. Site preparation and subsequent management should also be considered before undertaking any wildflower meadow restoration.

Method	Advantages	Disadvantages
Natural regeneration	Cheapest method of establishing species-rich grassland as no seed or farm machinery above that of livestock management is required. Plants establish at a time that is suitable for them with the right soil nutrient levels, biota and structure. Maintains the local distinctiveness of meadows and local genetic stock of plants.	Takes a long time for wildflowers to spread across a field by livestock alone. The donor seed source needs to be adjacent to the recipient field, with direct access that as much seed is transferred by livestock movement as possible. These fields are best managed as a single unit to encourage the greatest transfer of seed. Seeds of weed and problem species could be transferred along with the desirable wildflowers and wild grasses.
Green hay	Cheap-medium expense based on the cost of the hay crop that the farmer foregoes, and the use of standard farm machinery. Maintains the local distinctiveness of meadows and local genetic stock of plants. Usually green hay provides a more 'natural' appearance than using brush-harvested seed or a wildflower mixture.	Green hay involves taking the entire crop for re-seeding, leaving no hay crop for the farmer. The donor site and recipient site need to be local as the green hay must be harvested, transported and spread within half a day (preferably within a hour to stop heat build-up rendering the seed infertile). Seeds of weed and problem species could be transferred along with desirable wildflowers and wild grasses.

	Green hay is a quick method if logistics can be organised (harvesting-transfer-spreading). Spreading of green hay can be undertaken using an empty muck-spreader or where it has been baled can be put through a straw chopper and spreader to cover a larger area quickly. This is standard farm machinery. Un-ripe seed may continue to ripen once cut if the seed heads have established. Green hay can be taken and spread in damp conditions, as long as rainfall is not too heavy.	Only one opportunity to take seed as the hay is cut taking the seed heads, resulting in only collecting seed from plants that are about to shed and not early or late flowering plants. Logistical operations need to very tight with equipment to hand that is able to enter and traverse the field. In addition, larger sites can be a logistical challenge, as there needs to be regular trips between the donor and recipient sites so that green hay does not heat-up and become infertile.
Brush-harvested seed	Medium-high expense as specialist seed collection machinery is required which may be included in the cost. Maintains the local distinctiveness of meadows and genetic stock of plants if locally collected seed is used. May have a broader range of species compared with green hay as several sweeps of a meadow can be undertaken, collecting seed from early, middle and late flowering plants into a single seed mixture. If separate sweeps of the field cannot be undertaken, some hand collection could be carried out instead. Can be stored over a longer period, usually between harvest in July/August and December and can be spread at any point in this time allowing for a longer period for sowing. Maintains the hay crop for the farmer as only the seed heads are taken by the brush harvester.	Can be difficult to find a source of local brush-harvested seed from the right type of grassland. Seeds of weed and problem species could be transferred with desirable wildflowers and wild grasses. Can be difficult to spread un-cleaned brush-harvested seed mechanically, as the chaff can block seed hoppers. Specialised equipment may be required or spreading by hand. Brush harvested seed cannot be collected in the rain as water will prevent seed drying and may lead to the development of mould.

Seed mixture	Using seed enables a wider range of plants to be spread, which may increase the flowering time providing a longer lasting resource for pollinators and other wildlife. Specific mixes of seed can be created, especially if the soil is slightly nutrient-rich as more tolerant plants can be selected. Commercially bought seed will be cleaned reducing the chance of problem seeds being sown. Seed is likely to be small and clean enough to pass through a seed-hopper which is part of standard farm machinery.	High expense as commercial seed usually costs more than green hay or bush-harvested seed. Seed can be hand spread, but for larger sites a seed-hopper that drops seed onto the prepared field may be more efficient. Only maintains the local distinctiveness of meadows if plants present in the vicinity are included in the seed mixture. Otherwise, general mixtures may contain a broader spectrum of plants and could lose the local identify of meadows. Unlikely to preserve the local genetic stock of plants as seed is more likely to have come from elsewhere in the UK (it is recommended that seed suppliers that grow UK native varieties of plants are sources for wildflower mixtures).
Wildflower turf	Very quick as comes fully prepared for rolling out. Easy to lay-out and it soon starts growing. Flowers from the following year as perennial wildflowers have already grown to the rosette stage.	Very high expense, usually prohibitive except in a small area. The cost is higher as suppliers need the space to grow the wildflower turf prior to sale. Contains a limited range of wildflowers. Wildflower turf may have UK native species, but it is unlikely to be local to the recipient site unlike using green hay, brush-harvested seed or a specified local seed mixture.

Further comparison is available through individual projects, of which the Yorkshire Dales Millennium Trust's Hay Time project provides a good summary of their experiences in their final report.